

DANISH **R**ESearch **U**NIT FOR **I**NDUSTRIAL **D**YNAMICS

DRUID Working Paper No 01-15

**The Problem With Bounded Rationality:
On Behavioral Assumptions in
the Theory of the Firm**

By

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August, 2001

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Revised draft, 16 August, 2001

Abstract

I discuss and compare alternative approaches to integrating bounded rationality with the theory of economic organization, concentrating on the organizational capabilities approach, which is strongly influenced by the works of Nelson and Winter, organizational economics, particularly transaction cost economics, and, finally, a small subset of the literature on biases to judgment and cognition. I argue that, contrary to the conventional view, both the organizational capabilities approach and transaction cost economics treat bounded rationality rather “thinly,” the former being in actuality more taken up with organizational routines than individual boundedly rational behavior, the latter only invoking bounded rationality to the extent that it helps explaining incompleteness of contracting. The rich literature on cognitive biases, etc. suggests a “thick” approach to bounded rationality that may be helpful with respect to furthering the theory of economic organization. Examples pertaining to the internal organization of firms are provided.

Key words: capability, organizations, transaction costs

JEL: D81, L22

ISBN 87-7873-114-3

Acknowledgment

I am grateful to Kirsten Foss for discussion of many of the issues treated herein, and to Giovanni Dosi, Peter G. Klein, Sarah Kaplan and Scott Stern for comments on an earlier version of this paper.

“Nothing is more fundamental in setting our research agenda and informing our research methods than our view of the nature of the human beings whose behavior we are studying” (Herbert Simon 1985: 303).

I. Introduction

Few concepts in social science come with such a number of interpretations, connotations, and diverse modeling efforts as bounded rationality. This is quite confusing, and makes it necessary to confront users of the concept with questions as to whether they are talking about Newell and Simon's work on heuristic search, or Selten's aspiration adaptation theory, or Lipman or Rubinstein's axiomatic foundations for bounded rationality, or regularities established in experimental psychological research, or another one of the great number of different — indeed, very different — variations on Simon's Grand Theme. Not only is there is very little agreement on what the concept means — apart from vague phrases such as that “man is intendedly rational, but only limitedly so” —, there is also substantial disagreement as to what exactly it implies with respect to understanding the behavior and organization of firms. Nevertheless, many contributors to the theory of economic organization — from Roy Radner over Oliver Williamson to Richard Nelson and Sidney Winter — see it as a crucial ingredient in their work. Some have argued that it is the key shared assumption between the evolutionary or organizational capabilities theory of the firm and transaction cost that makes these approaches differ relative to mainstream economics (e.g., Winter 1988). This has even prompted speculations that this supposed similarity may assist in bringing the two approaches closer together (e.g., Brousseau 2000).

The present paper discusses various strategies for incorporating bounded rationality in the theory of economic organization. Three such strategies are discussed, namely those associated with the organizational capabilities approach, organizational economics, and a third yet-to-be-developed approach in which the rich literature on biases to judgment and cognition is utilized for developing insights into efficient economic organization. As befits a contribution to a conference in honor of Nelson and Winter, particular attention is devoted to their treatment of bounded rationality in the context of firm organization and behavior — a treatment that Selten (1990: 649) characterized as having “... brought new impulses to the modeling of boundedly rational behavior in economics.” I also discuss the many ramifications of their analysis in the works of a host of other writers in the organizational capabilities approach. This approach is quite often seen as an approach to the theory of the firm that puts more of an emphasis on bounded rationality than is the case in, notably, transaction cost economics (e.g., Fransman 1994; Conner and Prahalad 1996; Marengo et al. 2000).

However, I shall argue that to the extent that economists of organization as well as business administration scholars wish to provide more room for considerations of bounded rationality in the theory of economic organization, they are not necessarily best served by the Nelson and Winter (1982) approach and its modern ramifications in the organizational capabilities approach (see also Witt 2001). I take this approach to be primarily characterized by an emphasis on 1) routinized action and 2) aggregate entities, notably organizational routines and capabilities. Given this, I argue, first, that the organizational capabilities approach is more about tacit knowledge embodied in routines and capabilities than it is about bounded rationality *per se*. Bounded rationality and tacit knowledge do not logically imply each other. Second, the organizational capabilities approach has no clear implications with respect to the key issues of the existence and boundaries of the firm; it also treats internal organization in a too primitive way. This is because it does not examine how the costs of exchange influence contracting — and in fact was never constructed for this purpose. The two arguments are related, I argue, for

the former is the cause of the latter (Section II, “*Bounded Rationality in the Organizational Capabilities Approach*”).¹

The modern economics of organization is, of course, all about comparative contracting; however, this body of theory has its own problems with bounded rationality. To the extent that it makes use of bounded rationality at all, it is in a strongly watered-down version in which bounded rationality is simply invoked to lend credence to contractual incompleteness, and little more. Its role seems to be largely rhetorical. In fact, the role of bounded rationality in producing the fundamental implications of transaction cost economics, for example, with respect to the influence of asset specificity on the boundaries of the firm, is unclear, as recent debate suggests (Section III, “*Bounded Rationality in the Modern Economics of Organization*”).

Both the organizational capabilities approach and the economics of organization only focus on one aspect of boundedly rational behavior, and, particularly in the case of the economics of organization, threat this in a highly abstract or “anonymous” manner. However, it is in fact possible to begin from richer and less anonymous conceptualizations of bounded rationality, and build much more directly on these. One possible approach is to explore to a larger extent Simonian ideas on heuristic search and problem-solving. This has been discussed, from very different perspectives, by writers such as MacLeod (2000) and Marengo et al. (2000). Another approach, and the one that I shall primarily discuss, begins from the literature on cognitive and judgmental biases, associated with such names as Tversky, Kahneman, Thaler and others. This latter approach essentially argues that biases to human judgment and cognition are not only persistent aspects of individual behavior (although educative efforts may reduce the severity of the biases); they are also key sources of frictions in contractual relations broadly conceived. In other words, they are key determinants of transaction costs, and therefore have implications for economic organization. In order to strengthen the case that a different approach to bounded rationality and economic organization may begin from this literature, I offer concrete examples pertaining to internal organization (Section IV, “*Bounded Rationality and Economic Organization: Where a Different Approach May Start*”).

II. Bounded Rationality in the Organizational Capabilities Approach

Briefly on the Nature and Origins of the Organizational Capabilities Approach

What I here call the “organizational capabilities approach” takes its name after chapter five in Nelson and Winter (1982), and should be taken as a shorthand for a relatively unified set of approaches to the behavior and organization of firms that all include Nelson and Winter (1982) as a key source of inspiration. The set includes capabilities, dynamic capabilities, and competence approaches, as well as some instances of the resource-based approach, and, of course, the “evolutionary theory of the firm.”² These approaches share a number of characteristics, most obviously an emphasis on experiential, localized knowledge and learning processes as a key aspect of the firm, as well as a tendency to harshly criticize the economics of organization, in particular (and for basically unexplained reasons), the notion of opportunism.³

¹ Williamson (2000) also criticizes the organizational capabilities approach. The present critique is more radical than Williamson’s.

² Some representative authors are Richardson (1972), Connor (1991), Langlois (1992), Foss (1993), Fransman (1994), and Connor and Prahalad (1996).

³ Like original sin, critiques of organizational economics keep coming back. I have sinned myself on previous occasions, for example, Foss (1993, 1998).

As Langlois and Foss (1999) point out, these approaches are also united in their attempt to increasingly go beyond their traditional *explananda* of explaining the sources of competitive advantage, localized innovative activity, and general rigidity of firm behavior to also include issues, notably the boundaries of the firm, that have traditionally been considered the turf of the more mainstream economics of organization. At the heart of these stories are the characteristics, notably tacitness, of the knowledge that is embedded in organizational capabilities (Kogut and Zander 1992; Langlois 1992). Some vaguely specified mechanism is supposed to link these characteristics to the boundaries of the firm.

It is quite common to interpret this literature as an attempt to provide more room for bounded rationality than is standard fare in the economics of organization (e.g., Conner and Prahalad 1996; Fransman 1994; Foss 1998). However, it is seldom made clear in exactly what sense the organizational capabilities literature may be characterized as starting from bounded rationality. Because bounded rationality is, unfortunately, a concept that comes with an legacy of diverse and even conflicting interpretations, it does matter where exactly one starts from and it is simply uninformative to say that the organizational capabilities approach builds on bounded rationality, unless one specifies what kind of bounded rationality. The organizational capabilities approach builds on numerous sources, such as the works of Philip Selznick, Alfred Chandler, Edith Penrose, G.B. Richardson — and Nelson and Winter (1982) (see Foss 1997 for a sampling). However, of these sources, Nelson and Winter are the only ones to explicitly address and incorporate bounded rationality. Understanding the extent to which the organizational capabilities approach builds on a foundation consisting of bounded rationality requires that we take a look at Nelson and Winter.

Nelson and Winter: Revitalizing and Extending the Behavioral Approach

Nelson and Winter's most important and celebrated publication, *An Evolutionary Theory of Economic Change*, has arguably appealed more to business administration and management (particularly strategy) scholars than to economists.⁴ One paper after another, in such fields as strategy, organizational learning and organizational behavior, have generously cited the book, particularly the three chapters (3 to 5) that deal with issues pertaining to individual and organizational behavior and capabilities. This is not surprising: Re-reading the chapters makes one realize that not so much has happened in more than a decade's work on capabilities, competence, evolutionary, etc. theories of the firm that goes substantially beyond Nelson and Winter's treatment. Contributors to this set of ideas have often treated Nelson and Winter (1982) not only as a source of inspiration, but as a foundation. At first sight this may appear somewhat surprising, given that building a distinct theory of the firm was never the intention of Nelson and Winter (1982).⁵ However, what may appeal to writers within the organizational capabilities approach is the attempt in that book to treat in a unified fashion bounded rationality and tacit knowledge and at the same time place these in a social context — all of which converges in a single, highly intuitively plausible concept, namely that of "routine."

Quite early in Nelson and Winter (1982), namely when discussing "the need for an evolutionary theory," the authors observe that their "... basic critique of orthodoxy is connected with the bounded rationality problem" (p.36). Given this, it is not surprising that they establish direct links, and are strongly indebted, to the behaviorist notion that short and medium run firm

⁴ See the citation analysis in Meyer (2001).

⁵ At the Academy of Management Meetings in Toronto, August 2000, Sidney Winter, in a major address, insisted that there is no theory of the firm in Nelson and Winter (1982).

behavior is determined by relatively simple decision rules (Cyert and March 1963).⁶ They also make use of behaviorist models of satisficing search. However, they go significantly beyond behavioralism by examining populations of firms with differing decision rules, by addressing the interplay between changing external environments and changing decision rules, and by trying to bring bounded rationality together with tacit knowledge. Given that ideas on organizational capabilities are now so much part of the discourse in the economics of organization, strategy and organizational behavior, it is easy to miss the significance of the three chapters, and not realize in how many ways they extend and indeed revitalize the behaviorist approach.

Nelson and Winter's main problem with "orthodox" theory, and particularly the neoclassical theory of the firm, does not appear to be that this theory rules out diversity in terms of productive or organizational capabilities between firms in an industry *per se* (as some contributors to the organizational capabilities approach have argued, e.g., Conner 1991). Indeed, that theory do allow for variety in these dimensions. For example, to the extent that differences in how well ("competently") a firm is run reflects owners' on the job consumption, and these owners are able and willing to bear the consequences of this consumption (Demsetz 1997), the neoclassical theory of the firm allows for differential competencies to exist in equilibrium. One may also simply postulate differential initial endowments of some costly-to-copy resources, so that firms with differential efficiencies may exist in equilibrium. However, the main point of Nelson and Winter's critique is that in mainstream economics, heterogeneity is at best exogeneously determined (as in the cases of differing preferences for on the job consumption or different initial endowments). To paraphrase their argument, in the setting of the (basic) neoclassical theory of the firm, it has to be in this way, because the production set is assumed to be not only given (or at best changing through given technological progress functions or similar constructs), but also to be fully transparent. The implication, as Demsetz (1991) notes, is that if information costs are thus assumed to be zero, what one firm can do on the level of production, another firm can do equally well.

Unlike Demsetz, Nelson and Winter do not cast their argument in terms of the information (and other) costs of copying rival firms' resource endowments. Instead, they devote a whole chapter (4) to an analysis of skills. By a skill, they mean "... a capability for a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs" (1982: 73). The attractions of the notion of skill are apparent. First, it provides a way of introducing dynamics on the level of production, since skills need to be nurtured and tend to grow with practice. Second, it provides a direct link to the behaviorist notion that behavior is strongly guided by relatively rigid decision rules. This serves to underscore Nelson and Winter's critique of maximization in the sense of forward-looking, informed deliberate choice. They put much emphasis on this, noting that "...the sort of choice that takes place in the process of exercising a skill is choice without deliberation" (p. 82), although they are careful to note that the behavioral "programs" embodied in skills may be initiated through deliberate choice. Third, it allows them to bring considerations of tacit knowledge into the picture and to develop a strong critique of the "blueprint" view of neoclassical production function theory. Fourth, it helps them to establish a link between individual action and organizational behavior. That link is initiated in a rather straightforward way by the observation that "... directly relevant to our development here is the value of individual behavior as a *metaphor* for organizational behavior" (1982: 72; emphasis in original).

⁶ Winter (1964b) wrote an early and favorable review of Cyert and March (1963). In a later paper (Winter 1986), he was quite explicit about the behavioral nature of the theory in Nelson and Winter (1982).

In turn, “organizational behavior” is addressed in terms of “routines” that serve as direct (metaphorical) equivalents to individual skills. Like skills, routines represent stable sequences of actions (i.e., they coordinate actions) that are triggered by certain stimuli in certain contexts and which, in a sense, serve as memories for the organizations that embody them. However, because routines are social phenomena, they go beyond the skill metaphor and raise issues of motivation and coordination. However, Nelson and Winter sidestep the motivation issue, arguing that routines represent “organizational truces,” another idea going directly back to Cyert and March (1963).

In sum, a lot — and perhaps too much — is packed into the notion of routine, including a variety of behaviors, organizational processes and arrangements, cognitive issues (e.g., “organizational memories”), and incentives.⁷ Nelson and Winter defend this by noting that, in actuality, “... skills, organization, and ‘technology’ are intimately intertwined in a functioning routine, and it is difficult to say where one aspect ends and another begins” (1982: 104). Although it is probably true that the boundaries are blurred, it is not clear why one isn’t excused, for purposes of analytical clarity, to look at one aspect at a time. It is one thing to claim that ontologically, things are a mess. It is another thing to openly admit the mess into analysis. This is perhaps only a minor problem for Nelson and Winter: Because their level of analysis lies higher than the firm, they can afford to keep the firm level messy. But their all-inclusive notion of routine has arguably contributed to the confusion in the literature since their book, which has been plagued by difficulties of giving precise content to the notion of routines (cf. Cohen et al. 1996) (not to mention “capabilities”).

Bounded Rationality in Nelson and Winter

At first glance, bounded rationality appears to be quite crucial to Nelson and Winter’s argument (Fransman 1994). Thus, firm members can only learn routines through practicing them; routines are simply repeated until they become too dysfunctional; learning is myopic, search is satisficing; etc. All of these very strong — and perhaps too strong — claims would seem to install quite prominent places for a rationality that is very bounded indeed. However, having (re-)read chapters 3 to 5 in Nelson and Winter, one is left with the feeling that what ultimately interests them is not really bounded rationality *per se* in the sense of a commitment to investigating specific models of boundedly rational individual behavior and tracing the effects of these on organizational outcomes. What interests them is rather tacit knowledge and its embodiment in their firm-level analogy to individual skills, namely routines, and how working with these notions assists the understanding of sluggish organizational adaptation. In fact, to put it a bit provocatively, it is not clear that they even need bounded rationality for the purpose of understanding such adaptation; if organizational members do not hold the same tacit knowledge, this may be sufficient to explain sluggishness, because of costly communication. Let me try to substantiate some of these assertions.

Bounded rationality has a bad reputation for being used as a sort of catch-all category that can “explain” all observed deviations from maximizing rationality (Conlisk 1996; Casson and Wadeson 1997). The Simon dictum that man is “intendedly rationality, but only limitedly so” is an example. It is almost completely vacuous (and therefore non-predictive) — unless it is coupled with other assumptions. This is where the link to Cyert and March (1963) and the skill metaphor of organizational behavior become important, for it is these additional ideas that allow Nelson and Winter to work out what is in principle a predictive theory of firm behavior. But

⁷ See also Winter (1986: 165) for a sophisticated further discussion and defence of this.

predictive ability has been obtained by adding *additional* assumptions about the skill-like dimensions of organizational behavior, rather than going into a analysis of the structure of boundedly rational decision making *per se*. To be sure, Nelson and Winter do mention and discuss bounded rationality to the extent that this helps them introducing the behaviorist notion of decision rules. Clearly such decision rules may be analyzed as manifestations of bounded rationality. However, agent level decision rules say nothing in themselves about organizational behavior. What permits the link to be established is the use of the skill metaphor. The aggregation problem, which is quite problematic in the presence of the variety of behaviors implied by the notion of bounded rationality, is, if not entirely suppressed, then to a certain extent sidestepped, by means of the analogy from skills to organizational routine. Thus, the whole construct works from an initial assumption about bounded rationality, goes from there to behaviorist decision rules, combines this with ideas on tacit knowledge as embodied in skilled behavior, and then transfers individually bounded rationality and skills to the level of routines and organizational capabilities.

In addition to the various problems pointed out in the Cohen et al. (1996) symposium on the meaning of routines, there are at least two further problematic consequences of this exercise. First, tacit knowledge and bounded rationality become indiscriminately lumped together. It is important to stress that tacit knowledge and bounded rationality represent different kinds of assumptions and do not necessarily imply each other. Thus, there can be tacit rules for maximization, as Machlup (1946) argued. Or, agents can cope with bounded rationality by means of fully explicit operating procedures. While one can certainly construct an argument that boundedly rational agents make use of experientially produced — and “skilled” — decision rules that are likely to embody a good deal of tacit knowledge, there is no necessary connection between bounded rationality and tacit knowledge. Second, and perhaps more seriously, individually bounded rationality becomes suppressed. For example, it is not clear in principle whether organization-level routinization is produced by interaction effects among the members of a team or whether it is ultimately founded in aspects of individual cognition (Egidi 2000: 2). In other words, there is no clearly identified mechanism that aggregates from individual behavior to routines and organizational behavior (Foss and Foss 2000a).⁸

In the end, bounded rationality is more a sort of background argument that — in combination with other assumptions about tacit knowledge and skilled human behavior — serves to make plausible the notion of organizational routine (including search routines), and therefore the sluggish organizational adaptation that is crucial in Nelson and Winter’s evolutionary story. In fact, it is the concept of routine, rather than individual bounded rationality that is centerstage in their discussion.⁹ There is nothing wrong with this *per se*. For the purposes of Nelson and Winter (1982) it is perfectly rational. However, as I argue next, transferring the notions of routines and the derived concept of organizational capability to other purposes may be highly problematic.

⁸ Later work in the evolutionary economics is not to the same extent vulnerable to this charge, notably the work of Egidi (e.g., 2000), Marengo et al, (2000), Warglien (e.g., 1995).

⁹ Moreover, those who are not committed to behavioralism may point out that even if one wishes to keep organizational routines central, it is not so obvious how essential bounded rationality really is. This may be argued in a number of ways. One can have perfectly rational standard operating procedures. It is possible to tell a story in which different routines in a population of firms emerge as solutions to appropriately specified games being played in each firms and with agents acting in a maximizing manner. Search behavior is easily reconciled with maximization. It is perfectly possible to tell sophisticated maximization stories about agents following rigid routines and procedures, once a full account is made of all relevant costs (e.g., costs of memorizing, depositing, retrieving, etc. information) (Casson and Wadeson 1997; Foss and Foss 2000b).

The Organizational Capabilities Approach and Economic Organization

The argument here is that certain characteristics of Nelson and Winter (1982) were carried over into the organizational capabilities approach, characteristics that are quite appropriate for the purpose of building a theory of rigidity in firm behavior as a part of a broader evolutionary story, but which are much less appropriate for the purpose of building a theory of economic organization.¹⁰ These characteristics have been discussed above. They are the strong emphasis on aggregate entities, notably routines and organizational capabilities, an emphasis that comes at the expense of attention to individual behaviors. This emphasis derives from Nelson and Winter's attempt to establish a *metaphorical* solution to the aggregation problem of moving from the level of the agent to the level of the organization. Because they fully recognize the metaphorical character of this maneuver, they don't commit the mistake of conflating an ontological claim with a useful research heuristic. Later contributors to the organizational capabilities approach may not have been as careful here as Nelson and Winter.

The problems seem to emerge rather unavoidably as soon as ideas on organizational routines and capabilities are transferred from their original place in the analysis of a population of firms to an analysis of the behavior and, particularly, organization of individual firms. While these notions have indeed been of value for the understanding of, for example, the sources of competitive advantage (although much of this literature is also plagued by conceptual ambiguity), their application to economic organization is more problematic.

For example, the much cited Kogut and Zander (1992) paper essentially argues directly from the tacit knowledge embodied in organizational capabilities to the boundaries of the firm. The supporting argument is simply that "firms know more than their contracts can tell". However, there is no attempt to address this in terms of comparative contracting. What exactly is it that cannot be written in contracts? Even if writing costs in fact are prohibitive, why cannot relational contracting, involving highly incomplete contracts, between independent parties handle the transfer of knowledge? Why is it only vertical integration that economizes with what are presumably writing and communication costs? No compelling answers are given to such questions. This is the case of most of this literature as it applied to economic organization. A partial exception is the work of Langlois (1992). Langlois attempts to supply the missing mechanism from organizational capabilities to the boundaries of the firm by means of the concept of "dynamic transaction costs," which are essentially communication costs that arise because of "dis-similar" (Richardson 1972) capabilities in a vertical structure of firms. Presumably efficient economic organization minimizes such costs (as well as other more "traditional" transaction costs, allowance being made for possible tradeoffs between these).

However, this idea may imply another difficulty, one that is also present in Nelson and Winter (1982) and in virtually all of the organizational capabilities literature. This difficulty is that knowledge inside firms is *assumed* to be homogenous (or at least not very costly to communicate), while knowledge between firms ("differential capabilities") is taken to be (very) heterogeneous (and therefore costly to communicate). Thus, Winter (1986: 175) assumes that "... the search for information from external sources does not proceed with the same ease as for internal sources." If this weren't the case, it is hard to see how communication costs could carry implications for the boundaries of the firm. Although there may be some intuitive appeal to the assumption, it is hard to accept that it should be generally true. There are many examples of

¹⁰ Foss (1996) discusses other problems with organizational capabilities theories as theories of economic organization.

firms where the bandwidth of the communication channels between some business unit of the firm and external firm (e.g., buyer or seller) is much higher than the bandwidth between the unit and, say, corporate headquarters. Moreover, the implicit assumption that knowledge in hierarchies can be taken, at least as a first approximation, to be communicable at zero cost makes it hard to understand hierarchical organization, since with zero cost communication the managerial task has no economic rationale (Demsetz 1991; Casson 1994).

However, it is easy to see that such an assumption easily slips into the analysis when the units of analysis are routines or organizational capabilities. It is then easy to postulate that “firms know more than their contracts can tell” and that all organizational aspects are “intertwined in a functioning routine.” If instead the analysis had started from individual choice behavior, the argument that communication costs within, for example, certain business units may be lower than the communication costs between people in the unit and people in a supplier firm, might have been derived as an outcome of a properly specified model instead of being postulated. This is an indication that the emphasis on aggregate entities characteristic of the organizational capabilities approach makes a micro-analytic understanding of economic organization difficult.

Summing Up

To conclude, the main point of this section has been that the fundamental job for bounded rationality in Nelson and Winter (1982) is to supply arguments for invoking routines on the organizational level, and that boundedly rational individual behavior is not a central concern. Bounded rationality cannot do the job alone; other assumptions are necessary, and these become more central in their analysis than bounded rationality. In the hands of many of the followers of Nelson and Winter in the organizational capabilities approach, even less room is made for bounded rationality; what is all-important to these writers is rather tacit knowledge embodied in capabilities (e.g., Kogut and Zander 1992). However, because writers in the organizational capabilities approach devote little attention to individual choice behavior, their treatment of economic organization proceeds in terms of postulating somewhat crude causal relations between capabilities and economic organization, little attention being paid to the microanalytic issues involved. They are correspondingly vulnerable to simple critiques from the perspective of comparative contracting (Foss 1996; Williamson 2000).

It turns out that much of the organizational capabilities approach is vulnerable to much the same critique that Winter (1991) forcefully launched against the neoclassical theory of the firm. Specifically, and borrowing directly from Winter, it is in potential “conflict with methodological individualism” (p.181) (because of the emphasis on routines and organizational capabilities), “... provides no basis for explaining economic organization” (p.183) (because transaction costs and comparative contracting are not considered), lacks “realism” (because of its “unrealistic” treatment of decision-making as entirely guided by routines), and provides a “simplistic treatment of its focal concern” (e.g., because it is simply assumed that it is easier to gather, combine, source, etc. knowledge inside firms than between firms). The main underlying problem, it has been argued here, is that too little attention is devoted to boundedly rational *individual* decision-making. As I argue next, in organizational economics, bounded rationality has a similarly weak role, though for very different reasons. This gives rise to somewhat similar problems. Here, too, it is in actuality a background argument that in combination with other assumptions helps to rationalize other, supposedly more central, phenomena. And as recent theoretical debate has suggested (e.g., Tirole 1999), it is not clear whether those stories that claim to rely on bounded rationality in order to be able to explain key aspects of economic organization can actually accomplish this.

III. Bounded Rationality in the Modern Economics of Organization

Bounded Rationality: Spanners in the Works of Complete Contracting

Although the economics of organization may have been one of the first areas where the notion of bounded rationality was systematically applied in theorizing, later developments do not seem to have gone significantly beyond Simon (1951), Marschak and Radner (1972) and Williamson (1975). If anything, the use, or at least invocation, of the notion of bounded rationality may actually have declined.¹¹ To some extent this is because the economics of organization has developed into a highly formal and axiomatic enterprise, and bounded rationality has a bad reputation of only being given to formalization if that formalization is fundamentally *ad hoc* and the axiomatic basis is unclear or non-existent. That reputation may not be entirely justified (Rubinstein 1998), but most economists of organization (particularly contract theorists) certainly act as if it is justified. Oliver Hart (1990: 700-1) sums up the sentiments of many formal economists when he argues that

*... I do not think that bounded rationality is necessary for a theory of organizations. This is fortunate because developing a theory of bounded rationality in a bilateral or multilateral setting seems even more complicated than developing such a theory at the individual level; and the latter task has already proved more than enough for economists to handle.*¹²

In fact, some parts of the economics of organization, particularly contract theory, bear little substantial imprint of bounded rationality.¹³ Its only real job, if it is used at all, is to rationalize in a highly intuitive way why some contingencies may be left out of a contract (Milgrom and Roberts 1992). It is sometimes argued that transaction cost economics provides more room for bounded rationality than simply this (e.g., Brousseau 2000). There is something to this claim; for example, Williamson (1975) invokes bounded rationality in connection with, for example, explaining the M-form. Arguably, however, Williamson is more interested in making use of bounded rationality for the purpose of explaining the existence and boundaries of firms than for the purposes of explaining administrative behavior, as in Simon (1947). And for this purpose, boundedly rational behavior *itself* is not really modeled.

Instead, bounded rationality enters organizational economics reasoning in a loose background sort of way, in which it lends credence to exogenously imposing constraints on the feasible contracting space, but is not modeled itself. It supplies the rhetorical function of lending intuitive support to the notion of incomplete contracts. A Simonian information processing argument is sometimes invoked here (Hart 1990: 698; Schwartz 1992: 80). Thus, if agents do not have the mental capacity to think through the whole decision tree — for example, in complicated bilateral trading relations —, it seems reasonable to assume that some of the branches of the tree (such as those relating to some future uses of assets) cannot be represented in a contract; the contract is left incomplete. However, agents are supposed to deal with this manifestation of bounded rationality in a substantively rational manner, as many critics have

¹¹ For example, in Williamson's work, bounded rationality loomed larger in Williamson (1975) than it does in Williamson (1996).

¹² It should perhaps be added that Hart's (1990) notion of what constitutes a "theory of organizations" is quite limited: It is a theory of the boundaries of the firm!

¹³ For example, rational expectations are very important to most contract theory models. Applying the notion of BR to expectations formation would imply that much contracting would produce unintended consequences, producing a need for *ex post* governance (Williamson 1996), but this is not explored in contract theory.

pointed out since Dow (1987). Thus, the real function and importance of bounded rationality is actually quite limited in the modern economics of organization, even in those parts that purport to actively make use of it.

Because bounded rationality tends to be simply used as convenient spanners in the works of incomplete contracting, we are seldom or never given deep explanations in the economics of organization of what it actually is. For example, in a central chapter (5, “Bounded Rationality and Private Information”) in their well-known textbook, Paul Milgrom and John Roberts (1992: 128) define bounded rationality as a matter of “[l]imited foresight, imprecise language, the costs of calculating solutions and the costs of writing down a plan.” They go on to develop at length the implications of this in terms of imperfect contracts and subsequent problems of imperfect commitment between contractual parties. However, they do not develop or truly explain their definition of bounded rationality; it is merely a label for a convenient deviation from the “fully rational” contracting outcome. As Dow (1987) observed, these kinds of treatments of bounded rationality provoke a lurking suspicion of a basic inconsistency, for whereas bounded rationality is loosely invoked as a background assumption (yet still a necessary one), there is no hesitation to appeal to substantive rationality when the choice between governance structures must be rationalized.¹⁴ I discuss this next.

Bounded Rationality, Transaction Costs and Economic Organization: The Incomplete Contract Controversy

A recent theoretical debate on the coherence and foundations of incomplete contract theory — the “incomplete contract controversy” (Tirole 1999) — is quite pertinent to the issues under consideration here. As the name indicates, the debate concerns whether satisfactory foundations for incomplete contracts are offered in the works of Oliver Hart and associates (e.g., Grossman and Hart 1986; Hart and Moore 1990; Hart 1995). The main critics are Eric Maskin and Jean Tirole (Maskin and Tirole 1999; Tirole 1999). At the core of this debate is the explanatory tension between invoking transaction costs — which may be understood as a consequence of bounded rationality — on the one hand and postulating farsighted and substantively rational contracting on the other hand. However, whereas Dow (1987) interpreted this as an inconsistency in transaction cost economics, Maskin and Tirole show something else: There is no formal inconsistency; however, the use of transaction costs (i.e., bounded rationality) does not provide additional explanatory insight relative to models that make no use of these.

Organizational issues have largely motivated the upsurge in incomplete contract modeling during the last decade. In fact, the founding incomplete contract paper, namely Grossman and Hart (1986), was explicitly motivated by an attempt to model the emphasis in transaction cost economics on asset specificity as a key determinant of the scope of the firm, using modeling conventions and insights already developed in (complete contracting) agency theory and its basis in mechanism design theory. However, whereas Williamson (1996) puts much emphasis on inefficient *ex post* bargaining, the incomplete contracting approach assumes that *ex post* bargaining is efficient.¹⁵ Thus, what drives these models are misaligned *ex ante* incentives, particularly with respect to investment in vertical buyer-supplier relationships. The problem is to motivate what may cause such misalignment. The kind of (complete) contracting studied in agency theory also will not do. Under this kind of contracting, agents can perfectly 1) foresee

¹⁴ This asymmetry is discussed in greater detail in Foss and Foss (2000a) and Foss (2001).

¹⁵ These bargaining costs are not considered in the Maskin and Tirole critique. It is therefore unclear to exactly what extent their critique pertains to Williamson’s transaction cost economics.

contingencies, 2) write contracts, and 3) enforce these. This means that parties to an "investment game" can simply write contracts contingent on the levels of investment and payoffs. The implication is that in order to dilute investment incentives, bounded rationality/transaction costs must somehow mean that one or some combination of 1) to 3) do not hold true, so that, for example, contracts contingent on investments cannot be written.

The point of contention in the incomplete contracts controversy is whether transaction costs arising from the inability to perfectly anticipate or describe all relevant contingencies or enforce contract terms — all of which may be argued to turn on bounded rationality¹⁶ — constrain the set of feasible contracting outcomes relative to the complete contracting benchmark. If this is *not* the case, transaction costs (bounded rationality) do not suffice to establish the possibility of inefficient investment patterns. Therefore, they do not suffice to establish a role for ownership, and in turn for a theory of the boundaries of the firm.¹⁷

The argument builds on the assumption in the incomplete contract approach that although valuations may not be verifiable, they may still be observable by the parties. This implies that trade can be conditioned on message games between the parties. These games are designed *ex ante* in such a way that they can effectively describe *ex post* (where bargaining is efficient) all the trades that were not described *ex ante*. A further crucial step in the argument is accepting the typical contract theory assumption that parties allocate property rights and choose investments so that their expected utilities are maximized, knowing (at least probabilistically) how payoffs relate to allocations of property rights and levels of investment (i.e., they can perform "dynamic programming"). Given this, Maskin and Tirole (1999) provide sufficient conditions under which the undescribability of contingencies does *not* restrict the payoffs that can be achieved. This is their "irrelevance of transaction costs" theorem.¹⁸

Summing Up: Is Bounded Rationality "Irrelevant" in Organizational Economics?

There are further rounds to the debate than what is summarized here (e.g., Hart and Moore 1999). However, it is not necessary to go into these to see that the debate has potentially far-reaching implications for the use of bounded rationality in the economics of organization. Thus,

¹⁶ In the latter case (non-verifiability), it is the enforcing party, such as a judge, that is boundedly rational.

¹⁷ That is, within the particular set-ups adopted in contract theory.

¹⁸ To get an idea of their reasoning, consider the following simple example (from Tirole 1999). An agent attempts to produce an innovation (of positive value, V) for a principal. The agent incurs unobserved disutility of effort, $g(e)$ (with the usual assumptions on partial derivatives) and e is normalized to be the probability of making an innovation that is useful to the (risk-neutral) principal, so that the first-best effort level satisfies $g'(e) = V$. The agent incurs effort at stage 1. At stage 2 the parties observe whether a useful innovation resulted from the agent's efforts. Assuming that the fact that the agent has produced an innovation of value V is verifiable, the optimal contract stipulates a reward, y , which fully determines the agent's incentives and is payable to him if he produces an innovation of value V . Otherwise, he receives 0 (i.e., the contract is a forcing contract, so the agent is also risk-neutral). In the absence of discounting, the optimal reward, y^* , is given by $\max \{ e[V-y] \}$ s.t. $g'(e) = y$.

$$\{e,y\}$$

The solution satisfies $0 < y^* < V$, so that the principal trades off a high probability of discovery (high reward) and a low rent for the agent (low reward). If the parties cannot describe the innovation in the contract — that is, if indescribable contingencies are involved —, it may happen that the agent delivers an innovation of 0 value. The problem is then to design a mechanism that elicits the value of the innovation to the principal while not describing it *ex ante*, and, if possible, obtains the same pay-off outcome as when the innovation is *ex ante* describable. Such a mechanism may be a very simple public contract (i.e., the contract is lodged with an arbitrator or a court) that stipulates that 1) the agent describes the technique she has discovered and wants to transfer to the principal, 2) the principal then either accepts (paying $y = \lambda V$, $0 \leq \lambda \leq 1$) or turns it down (paying nothing), and 3) the contract cannot be renegotiated.

Maskin and Tirole (1999) show that there is no *logical* inconsistency involved in assuming that payoffs are fully foreseeable, yet parties are ignorant about the sources of that utility. If you like, Savage and Simon are compatible.¹⁹ However, they *also* show that very little, and perhaps no, economic content is added by introducing considerations of bounded rationality. Note that the Maskin and Tirole critique is also potentially damning for transaction cost economics to the extent that it relies on a substantively rational story of the design of efficient governance structures and to the extent that misaligned investment incentives are crucial here, too.

It is clearly not warranted to generalize from a single episode in an ongoing theoretical discussion that has not yet reached a definitive conclusion. However, in the light of the debate, it is tempting to make the conjecture that the reason why the modern economics of organization has not yet succeeded in providing a convincing explanation of the key issues of economic organization, particularly the boundaries of the firm, is that it fundamentally stays close to the basic complete contracting model and allows for very little room for bounded rationality. Thus, while the treatment of bounded rationality in the modern economics of organization is completely different from that of the organizational capabilities approach, the treatments in both theories mean that they have difficulties addressing key issues of economic organization. The other side of the coin is that the Maskin and Tirole argument may be taken as an invitation to make more room for bounded rationality in the economics of organization (cf. also Radner 1996). Thus, one may postulate that the parties to a contract cannot foresee, even probabilistically, their payoffs; this assumption ruins the Maskin and Tirole argument. However, they may expect that their payoffs are above a threshold level, and make a satisficing governance choice on this basis. Rather than pursuing this approach, in the following section I sketch, in an admittedly highly speculative and sketchy manner, a different way of making more room for bounded rationality.

IV. Bounded Rationality and Economic Organization: Where A Different Approach May Begin

The argument in this section is that there is another strategy for incorporating bounded rationality in the theory of economic organization than trying to smuggle bounded rationality in through the backdoor by *ad hoc* restrictions on the contracting space that agents confront or by assimilating it under organizational routines. This is to follow a program of 1) taking seriously the massive body of research in psychology and cognitive science on biases to human cognition and judgment, 2) build on this in the sense of identifying regularities with respect to in which ways human decision-making differs from the Savage model, and 3) examine their implications for transaction costs and, hence, for comparative contracting. Such an approach avoids starting the analysis of individual and organizational behavior and organization from aggregate concepts, such as routines and organizational capabilities (in contrast to the organizational capabilities approach). It places individually boundedly rational behavior centerstage, instead of keeping it in the background (as in organizational economics). It builds on regularities identified in experimental research and thus provides a rich, empirically informed account of behavior (in contrast to the economics of organization). Finally, it is consistent with the fundamentals of the economics of organization, that is, an economizing orientation, a comparative contractual perspective, and an emphasis on transaction costs as key to the explanation of economic organization.

¹⁹ However, as Kreps (1996: 565) laconically observes in a comment on Maskin and Tirole, "... not everything that is logically consistent is credulous." See Foss (2001) for further discussion.

A Modeling Approach

Systematic research on human cognition has been going on for at least one hundred years. However, it is perhaps particularly in the last two or three decades that strong and cumulative experimental work has revealed that 1) the human capacity to process information is quite limited, 2) humans try to economize on cognitive effort by relying on short-cuts, and 3) because of 1) and 2), as well as other factors, such as the influence of emotions on cognition, human cognition and judgment is subject to a wide range of biases and errors. Economists of organization have taken an interest in 1), have been somewhat less occupied with 2), and have almost entirely neglected 3).²⁰ They have done so at their peril, as the fruitful work, centering on 3) and performed by economists working on behavioral finance, law and economics and cost-benefit analysis suggests. However, the argument here is that taking fuller account of the relevant psychological and cognitive literature will produce additional insight into economic organization in a way that is entirely consistent with the basic explanatory thrust of the economics of organization. A similar argument has recently been sketched by Williamson (1998); in fact, much of the following may be seen as an attempt to unfold aspects of this paper. Drawing in particular on Rabin (1998), he argues, as above, that the many ramifications of bounded rationality should be explored with a view to first identify those regularities in decision-making that differ from the classical model of von Neumann-Morgenstern-Savage, then work out the implications of these regularities for efficient organization, and finally fold these into the organizational design (Williamson 1998:18). This will provide a fuller picture of the extent to which "... organization can and should be regarded as an instrument for utilizing varying cognitive and behavioral propensities to best advantage" (Williamson 1998: 12).

As I interpret Williamson's program, it is a call for exploring "mechanisms" (Hedström and Swedberg 1998), that is, causal connections that may or may not be triggered in specific situations, rather than for searching for general regularities. To be more concrete, it is a call for exploring how a *specific* manifestation of bounded rationality — such as, say, reference level biases — translate into transaction costs confronted by agents in a *specific* setting, and how this influences the contract or governance structure chosen by these agents to regulate their trade.²¹ This is not necessarily to say that one ends up with a mass of extremely partial models of strongly limited applicability, that is, with "history" rather than "theory." Insights of rather general applicability may follow. For example, Babcock and Loewenstein (1998) argue that self-serving biases are likely to be a very frequent determinants of a specific type of transaction costs, namely bargaining impasse.

Overall Implications

A limitation of Williamson's (1998) paper (if not of the program he suggests) is that he seems mostly intent on demonstrating that the many findings on biased cognition and judgment and strange preferences are entirely consistent with "[t]he transaction cost economics triple for describing human actors — bounded rationality, farsighted contracting, and opportunism," rather than inquiring into how *specifically* these findings may add to and complement the transaction cost economics approach. On a basic level, organizations may indeed be instruments for utilizing varying cognitive and behavioral propensities to "best advantage." Much of that can be

²⁰ It is far from obvious why this is so. In Foss (2001) I speculate that it may have to do with Simon's overwhelming influence on those economists who have addressed economic organization. Simon never really took much of an interest in cognitive biases and the like.

²¹ Formal work in contract economics in such a vein has recently commenced (e.g., Mookerjee 1998; Carmichael and MacLeod 1999).

accomplished simply through specialization and assignment. This is, of course, entirely consistent with organizational economics. However, organizations also economize on bounded rationality by curbing the less fortunate manifestations and consequences of biases and errors in decision making, time-variant preferences, and the like.²² For example, as the student of the human resource management literature will know, performance evaluation in firms is undertaken not so much for the purpose of tying merit pay to performance, as for the purpose of providing employees with feedback on strengths and weaknesses — including behavioral aspects that are manifestations of bounded rationality.²³

Thus, a first preliminary implication (rather, claim) is that paying more attention to such behavioral aspects allows for a richer understanding of the managerial task. In addition to performance assessment, the tasks of the manager may also include correcting biases in judgment, curbing problems of procrastination and impulsiveness, influencing organizational expectations, and manipulating preferences.²⁴ In addition, this helps to resolve some empirical puzzles that confront organizational economics. For example, in many work situations, precise signals on output are available, yet monitoring still takes place. Office workers may thus be supervised although it is trivial to count the number of forms they have processed at the end of the day. It seems unrealistic to argue that some random and unobservable factor should intervene in the work process, shifting too much risk on to the agent. A more realistic explanation is lack of self-discipline in the performance of a boring job (Rabin 1998). Thus, although the basic thrust of organizational economics is likely to survive confrontation with psychological findings on bounded rationality, it is also likely to be changed as a result of this confrontation, perhaps quite strongly. In order to see this, it is necessary to go into more detail with respect to the nature of biases to rationality, cognition and preferences.

Biases to Rationality, Cognition, and Preferences

Most of mainstream economics involves uniform and perfect cognition. For example, the common prior assumption is routinely made in much of the economics of organization (Radner 1986). Until approximately 1980 few economists criticized (noticed?) the uniform and perfect cognition postulate. Since then the massive and rapidly accumulating literature in cognitive science, cognitive and social psychology and experimental economics on biases to rationality, cognition and preferences has been not only cited by economists, but also increasingly used (see Rabin 1998 for a survey). Strictly speaking, not all of this literature is about bounded rationality. For example, work in psychology and experimental economics on “social” (i.e., other-regarding) preferences may lie outside its orbit. On the other hand, much of the literature exclusively concerns cognitive issues, such as the systematic violations of the standard theory of behavior under uncertainty that real people engage in. This literature would be considered by most to be directly about bounded rationality. However, in actuality the boundaries between cognition and preference are blurred, and an important part of the literature lies on those blurred boundaries

²² Fransman (1994) argues that a concern with bounded rationality makes “economizing” close to being meaningless, an argument that seems to be founded on interpreting “economizing” to be identical to the caricature of fully-informed maximization.

²³ Consistent with this, much of the literature on cognitive biases demonstrate that biases and errors may strongly diminish in importance as a result of instruction, that is, having one’s errors pointed out.

²⁴ Another implication is that more room is created for *ex post* governance than is usual in the economics of organization: If indeed agents cannot perfectly foresee all contingencies and calculate the payoffs of their relations or if their estimates of these payoffs are biased, unintended consequences are likely to follow. In turn, this may give rise to haggling, as the parties try to adjust. The costs of haggling may be reduced by means of *ex post* mechanisms, such as the authority relation.

(e.g., March 1999).²⁵ Thus, in the following, I deliberately and rather indiscriminately mix preference and cognition when discussing various manifestations bounded rationality. Here is a telegraphically stated and arguably incomplete catalogue of biases that, I shall argue, are relevant to the understanding of economic organization.

The availability heuristic — that is, people tend to think that events are more probable if they can recall incidents of their occurrence. An example is that people typically think that more words, on any given page, will end with the letters “ing” than have “n” as the second-to-last letter (although clearly this is not possible). The availability heuristic has been argued to be particularly relevant to the understanding of risk assessments (Sunstein 1999), particularly since the availability heuristic implies that risk assessments are likely to be strongly conditioned by social, particularly informational, forces.

Reference level biases — this is a family of biases that includes loss aversion (*aka* the status quo bias), the endowment effect, the diminishing sensitivity bias, and the self-serving bias. Common to these is that they all involve a reference point. The most basic one is arguably loss aversion. Under loss aversion, a loss relative to the *status quo* is seen as more undesirable than a gain relative to the same *status quo* is seen as desirable. A closely related bias is the endowment effect, that is, once a person comes to possess a good, he will value it more than before he possessed it. Kahneman, Knetsch and Thaler (1990) empirically examine the implication of the standard assumptions of economic theory that (when income effects are 0 or small) a person’s maximum willingness to pay for a good should be roughly the same as the minimum compensation demanded for the same good. They find that contrary to theoretical expectation and controlling for strategic behavior and transaction costs, there are systematic differences between these numbers, in the sense that when people are given goods their valuation of those goods increases strongly and instantaneously. The diminishing sensitivity bias implies that the marginal effects of changes in well being are greater when change is close to one’s reference level than for changes farther away (Rabin 1998). Finally, the self-serving bias is essentially the conflation of what is fair with what benefits oneself (Babcock and Loewenstein 1997). Thus, people systematically overestimate their own contribution to joint tasks.

Adaptive preferences — that is, the phenomenon that preferences, such as risk preferences (March and Shapira 1992; March 1996), adapt to experience in a manner that roughly corresponds to people coming to prefer what they experience. This may produce intertemporal inconsistency in revealed choices. Adaptive preferences are evidently closely related to reference level biases, and may to some extent be seen as a dynamic version of reference level biases.

Preference reversal — that is, the quite pervasive phenomenon that people are inconsistent when considering two gambles of equal expected value, one gamble having a high probability of winning a moderate stake and the other a low probability of winning a larger stake. The finding is that many persons who prefer the former over the latter when required to choose between

²⁵ In his overview paper, Rabin (1998) explicitly tries to distinguish relevant psychological contributions on the basis of whether they relate to “biases in judgment” (i.e., cognition) or to “preferences.” However, as he admits, the distinction is far from watertight; for example, framing effects “... may in fact partially *determine* a person’s preferences (1998: 37; *emph.* in original). See also Lindenberg (1988) for a related point. If one thinks of bounded rationality in a general Simonian way as an imperfect ability to perceive, learn about, compare, remember, and order alternatives “strange” (e.g., time variant or context dependent) preferences are to be expected. For example, March (1996) argues that the fact that people exhibit greater risk aversion for gains than for losses in many situations (i.e., a *risk preference*) may reflect accumulated learning (i.e., a *cognitive* activity) rather than given utility functions.

gambles, actually put a higher minimum selling price on the latter than the former, when they are asked to evaluate the very same gambles. Preference reversal may be seen as an instance of a broader class of biases, namely framing effects (Tversky and Kahneman 1986), which refers to the general phenomenon that people often lack stable preferences that are robust to different ways of eliciting those preferences (Rabin 1998).

Biases in the Context of Economic Organization: Some Impressionistic Examples

As Williamson (1998) argues, biases to rationality, cognition, and preferences are mitigated to a large extent by organization. This is because organization has recourse to specialization, which allows for economizing with cognitive effort. That does not make these biases irrelevant to the study of organization. On the contrary, since specialization cannot cope with all biases, recourse to additional organizational measures is likely to be necessary. In order to see this, it is necessary to inquire into how biases affect economic organization. One take on this issue is to think of biases as influencing economic outcomes because they influence bargaining (Kahneman, Knetsch and Thaler 1990; Babcock and Loewenstein 1997). In such a perspective, biases may be viewed as determinants of bargaining outcomes on par with asymmetric information, strategic behavior and time preference. For example, as Babcock and Loewenstein (1997) argue, the self-serving bias may drastically narrow the contract zone, and perhaps eliminate it altogether.

To be more concrete, what people believe that they deserve in a bargaining situation may be subject to reference level biases. In turn, reference levels may change over time as a result of the phenomenon of adaptive preference (e.g., in a repeated bargaining situation). The comparisons people make when evaluating their gains and losses from bargaining, and how they evaluate the same offers in different contexts (e.g., as made by different people), may be subject to framing effects. In the context of economic organization, biases may thus influence how much employees expect to capture of the firm's surplus (and therefore how much they are going to invest in augmenting their human capital), how competitive threats are perceived, how the gains from trade in inputs markets will be shared, etc. In the context of economic organization, biases may influence both explicit contract terms and the bargaining games that take place in the context of relations where contracting is incomplete (i.e., *ex post* renegotiation games). The ramifications are clearly many and complicated; only a few will be considered here.

Example 1: Loss aversion, employee expectations and strategic change. In order to spell out some implications of loss aversion, imagine a dramatic change in corporate strategy so that the focal firm withdraws from a number of markets, downsizing and concentrating on core business. Of course, many employees in addition to those that may be laid off will suffer a loss of utility as a result of this. Since the change is likely to be at least partly negotiated between the various stakeholders of the firm, management and owners are likely to offer various side-payments to reduce these losses of utility. Strategic behavior is likely to complicate the ensuing bargaining. However, the phenomena of loss aversion and adaptive preferences are likely to further complicate bargaining games.

First, loss aversion implies that the proposed strategic change will involve a mixture of painful losses and less-pleasurable gains so that people will tend to resist change. Inertia is predicted by loss-aversion alone. Second, in an employee relationship, employees develop implicit and explicit expectations to the contract governing the relationship, and particularly to the benefits that they believe they deserve under the implicit contract, that is, their "entitlements" (Heath et al. 1993). There is psychological evidence that people tend to be systematically biased in their

estimates of their entitlements. More specifically, these are perceived as richer (people think they contribute more than they do) and more systematic (because rare events are often given probability zero, the consistency of others' behavior is over-estimated) than they would be to a neutral observer (*idem.*). The combined implication of loss aversion and the development of expectations with respect to entitlements is that side-payments are likely to be much larger than an "objective" evaluation would suggest.

Various implications follow. First, the economics of organization implicitly claims that organizations are plastic. Notions of complementarity between elements of the organization and strategic behavior may complicate this, but provided that organizations can be changed in a systemic fashion and informational asymmetries do not pose too much of a problem, there should not be any remaining problems of organizational change. However, the phenomena of loss aversion and adaptive preferences are relevant mechanisms that may cause substantial organizational inertia and make organizational change more costly than an organizational economics analysis would indicate. Thus, although alternatives to existing organizational arrangements can be imagined, the set of alternatives that can be implemented with net gains is further circumscribed. The other side of the coin of adaptive preferences and loss aversion suggest is that an important part of *ex post* governance is the management of the formation of the expectations of those agents with which the firm bargains over inputs and outputs. The ultimate sharing of value will not just be a matter of the "objective" contribution of each agent, but will also reflect players' perception of their "legitimate" entitlements. Management and leadership have an important role in influencing those perceptions.

Example 2: Leadership behavior and the availability heuristic. The previous example indicates that an implication of the combined effects of loss aversion and adaptive preferences is to make any *status quo* salient. However, the availability heuristic may counteract that tendency. The fact that the availability heuristic is likely to be very strongly socially conditioned only helps here. For example, public announcements by a CEO that the competitive situation faced by the firm is threatening may create informational externalities, because the announcement is taken as a relevant signal by employees. When there is little information about the true state of competition, such externalities may create informational cascades (Sunstein 1999). If further this announcement is combined with a call for wage reductions, there is potentially ample room for the kind of employer opportunism discussed by Dow (1987) but neglected in most of the economics of organization. Thus, one possible application of the availability heuristic is to broaden the role of opportunism in organizational economics.²⁶

Example 3: Context-dependent risk-preference. An implication of preference reversal and adaptive preferences is that risk-preference is likely to be context-dependent. Specifically, March and Shapira (1992) argue that risk-taking is influenced by danger (threats to survival), slack (more slack leads to more risk-taking), aspiration levels (people are risk-seeking under the target level and risk-averse above), whose resources are at risk, and past experience. This suggests that the efficiency of incentive contracts, which partly relies on shifting risks between parties, is context dependent, and that some kinds of incentive contracts may in some contexts have perverse consequences. For example, consider a firm that not only falls much below its own aspiration levels, but also begins to confront difficulties with sales, and ultimately of paying creditors. In this situation, managers may, because of the context-dependence of risk preference,

²⁶ See also Lindenberg (1988) for the point that behavioral concerns may broaden the notion of opportunism. Thus, Lindenberg argues that framing effects may lead to myopia that may increase the threat of opportunism in contractual relations.

want to assume more risk than would be sensible to a neutral observer. If they have been equipped with incentive contracts in the form of golden parachutes, their incentives to actually assume excess risks will be strengthened. Incentive contracts that have not been designed with an eye to the context-dependence of risk-preference may therefore misstate the “true” risk-allocation inherent in the contract, given the various states of nature that may be realized.

Example 4: Groups and Organization Design. The use of group-based decision-making is an increasingly important aspect of modern organization. Arguably, the use of groups is partly determined by the phenomenon — well known to social psychologists — that group decisions differ from individual decisions in an organizational context and that groups can change the behavior of their members. The positive aspect of this is that groups may give rise to distinct synergies, stemming from improved problem-solving. The improved problem-solving that is available to teams/groups has been strongly emphasized in, for example, the Total Quality Management movement. Thus, adherents of TQM advocate extensive delegation of decision rights to groups to promote a closer co-location of decision rights and specific, local knowledge *and* a faster and more efficient decision-making process.

Although group interaction may thus yield certain types of informational rents, a rich literature in social psychology indicates that groups have biases of their own. The costs associated with such biases may offset potential benefits. For example, a rather robust phenomenon is the “risk-shift phenomenon” in which group compromise leads to the adoption of a most risky common view. This may well be related to the “groupthink” phenomenon, that is, the tendency of the sharing of mental models to lead to incomplete surveys of alternatives and objectives and failures to fully examine the risks of available alternatives, in turn leading to excessive optimism and risk-taking and a suppression of “heretic” ideas. Organizational economists have known at least since Alchian and Demsetz (1972) that groups/teams may fall victim to free-rider problems, and that this may help explaining aspects of the organization of firms. As the above indicates, free-rider problems are not the only problems of the current trend of disaggregating corporations into smaller teams. Among the relevant costs of increased disaggregation are the potential costs of promoting groupthink-phenomena within groups/teams (although this may mean that corporation-wide groupthink may be reduced).

Summing Up

Many other similar examples could be constructed based on the many cognitive biases that have not been reported here.²⁷ Moreover, it would also be possible to examine implications for other aspects of economic organization than internal organization. However, the examples hopefully serve to indicate the main thrust of the argument: It is possible to tell stories about economic organization that pay much more attention to bounded rationality — in the form of work in social and cognitive psychology and cognitive science on biases and strange preferences — but still does not fundamentally break with explanatory fundamentals of organizational economics, that is, keeps intact an economizing orientation, methodological individualism, a focus on the costs of transacting, and comparative contracting. The above examples indicate that this kind of research will enrich the understanding of the sources of organizational inertia and the barriers to organizational change, the analysis of opportunism, the design of incentive contracts, and organizational design.

²⁷ Examples may include the effect of frequent performance evaluation on the framing of decision situations and the effect of framing on risk preferences.

On the overall level, taking account of “thicker” notions of bounded rationality than is standard fare in organizational economics and the organizational capabilities approach means that there are certain research heuristics in the economics of organization that becomes problematic, notably the use of rational expectations/dynamic programming. On the other new heuristics may be added, such as the idea that biases to cognition and judgment, etc. may be analyzed as determinants of transaction costs on a par with the usual determinants identified in the economics of organization. With respect to the outcomes of theorizing, the conjecture here is that the introduction of biases to cognition and judgment means that the set of feasible outcomes is different from what is described in the economics of organization, for example, because reference level biases constrain this set. As the above sketchy examples indicate, this may help adding more managerial relevance to organizational economics.

V. Conclusions

This paper is founded on the observation that although quite a number of contributors to the theory of economic organization have agreed on the importance of bounded rationality to their subject area, upon closer inspection it turns out that there is little agreement on 1) what exactly is the nature of bounded rationality, 2) how it should be modeled, and 3) its implications for the behavior and organization of firms.²⁸ Perhaps because there is little clarity with respect to the nature and modeling of bounded rationality, bounded rationality, in the actual practice of those economists that are taken up with firms and other organizations, tends to step into the background. For this reason, its implications for the organization and behavior of firms are also quite unclear.

Thus, I have argued that — somewhat contrary to the way in which approaches such as transaction cost economics and evolutionary economics are usually portrayed (e.g., by Augier, Kreiner and March 2000) —, the role of bounded rationality in both organizational economics and in the organizational capabilities approach is very much a background one. It serves to make plausible the notions of incomplete contracts and organizational routines. Its role is arguably more rhetorical than substantive. In both transaction cost economics and the organizational capabilities approach, boundedly rational individual behavior is in actuality not modeled. I have argued that this results in certain explanatory problems for these approaches, particularly with respect to addressing issues such as the boundaries and internal organization of firms.

However, one thing is pointing out this difficulties; another things is devising concrete remedies. I have suggested, albeit in a highly impressionistic way, that the rich literature on cognitive biases and the like may be an appropriate place to start. Many of the relevant biases, etc. are well established in experimental research and have rather direct implications for organization and contract design. They allow for an empirically grounded understanding of a neglected set of contractual hazards and frictions, and therefore a richer understanding of the determinants of transaction costs. By means of exemplification, I have argued that such an approach has real implications for economic organization, more specifically internal organization. Because of space limitations, implications for issues relating to the boundaries and existence of firms, and wider issues of contract design, have not been developed. Future work will address these issues.

²⁸ Although this paper is not the first to make this kind of observations (e.g., Casson and Wadeson 1997), many of those who write about bounded rationality proceed as if the problems were non-existent. See, for example, the December 2000 Special issue of *Industrial and Corporate Change*.

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Danish Research Unit for Industrial Dynamics

The Research Programme

The DRUID-research programme is organised in 3 different research themes:

- *The firm as a learning organisation*
- *Competence building and inter-firm dynamics*
- *The learning economy and the competitiveness of systems of innovation*

In each of the three areas there is one strategic theoretical and one central empirical and policy oriented orientation.

Theme A: The firm as a learning organisation

The theoretical perspective confronts and combines the resource-based view (Penrose, 1959) with recent approaches where the focus is on learning and the dynamic capabilities of the firm (Dosi, Teece and Winter, 1992). The aim of this theoretical work is to develop an analytical understanding of the firm as a learning organisation.

The empirical and policy issues relate to the nexus technology, productivity, organisational change and human resources. More insight in the dynamic interplay between these factors at the level of the firm is crucial to understand international differences in performance at the macro level in terms of economic growth and employment.

Theme B: Competence building and inter-firm dynamics

The theoretical perspective relates to the dynamics of the inter-firm division of labour and the formation of network relationships between firms. An attempt will be made to develop evolutionary models with Schumpeterian innovations as the motor driving a Marshallian evolution of the division of labour.

The empirical and policy issues relate the formation of knowledge-intensive regional and sectoral networks of firms to competitiveness and structural change. Data on the structure of production will be combined with indicators of knowledge and learning. IO-matrixes which include flows of knowledge and new technologies will be developed and supplemented by data from case-studies and questionnaires.

Theme C: The learning economy and the competitiveness of systems of innovation.

The third theme aims at a stronger conceptual and theoretical base for new concepts such as 'systems of innovation' and 'the learning economy' and to link these concepts to the ecological dimension. The focus is on the interaction between institutional and technical change in a specified geographical space. An attempt will be made to synthesise theories of economic development emphasising the role of science based-sectors with those emphasising learning-by-producing and the growing knowledge-intensity of all economic activities.

The main empirical and policy issues are related to changes in the local dimensions of innovation and learning. What remains of the relative autonomy of national systems of innovation? Is there a tendency towards convergence or divergence in the specialisation in trade, production, innovation and in the knowledge base itself when we compare regions and nations?

The Ph.D.-programme

There are at present more than 10 Ph.D.-students working in close connection to the DRUID research programme. DRUID organises regularly specific Ph.D-activities such as workshops, seminars and courses, often in a co-operation with other Danish or international institutes. Also important is the role of DRUID as an environment which stimulates the Ph.D.-students to become creative and effective. This involves several elements:

- access to the international network in the form of visiting fellows and visits at the sister institutions
- participation in research projects
- access to supervision of theses
- access to databases

Each year DRUID welcomes a limited number of foreign Ph.D.-students who want to work on subjects and projects close to the core of the DRUID-research programme.

External projects

DRUID-members are involved in projects with external support. One major project which covers several of the elements of the research programme is DISKO; a comparative analysis of the Danish Innovation System; and there are several projects involving international co-operation within EU's 4th Framework Programme. DRUID is open to host other projects as far as they fall within its research profile. Special attention is given to the communication of research results from such projects to a wide set of social actors and policy makers.

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